ABSTRACT

A fuel cell structure and method of manufacture is disclosed that enables very low cost fabrication using conventional semiconductor manufacturing facilities. The fuel cell structure permits fabrication of all the salient features on one side of a single planar substrate. Electrical current extractor lines, electrodes with catalyst, proton exchange membrane, fuel and oxidizer channels, manifolds for each cell and channeled cover plate are all fabricated sequentially through additive and subtractive processing on one side of a planar substrate. The structure provides for ion exchange membrane conduction to take place parallel to the plane of the cell. The design and manufacturing technique allows for the production of a very small elemental cell with high power density. The monolithic structure provides for the stacking of the elemental cells or entire interconnected substrates by virtue of built in fuel and oxidizer manifold chambers fabricated within each elemental cell.